Chapter 14

Federal Research and Development in Illinois

- Approximately $1.4 billion of federal R&D funds are spent each year in Illinois.
- Illinois ranks 17th among the 50 states, District of Columbia, and Puerto Rico in terms of the amount of federal R&D dollars received annually.
- Approximately 7 percent of all federal funds received by Illinois for purposes other than the direct support of individuals (i.e., such entitlements as retirement, and disability, and housing assistance) is spent on R&D.

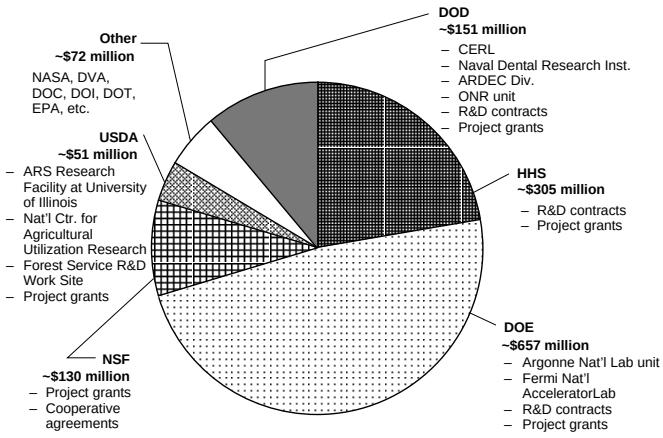

Figure 14.1 – Sources of Federal R&D Dollars Spent in Illinois (Total Federal R&D ~$1.4 billion)

Background

In recent years, the federal government has spent in the neighborhood of $1.4 billion annually in Illinois on research and development (R&D) activities. On average, federal R&D dollars account for approximately 7 percent of all federal funds received by Illinois for purposes other than the direct support of individuals (i.e., such entitlements as retirement, disability, and housing assistance).

Most major federal agencies that currently support federal R&D efforts provide funding for R&D activities in Illinois. Foremost among these agencies is the Department of Energy (DOE), which accounts for 48 percent of the federal R&D dollars spent in the state. The Department of Health and Human Services (HHS), the Department of Defense (DOD), and the National Science Foundation (NSF) account for an additional 22, 11, and 10 percent, respectively. The remaining federal R&D dollars spent in Illinois come collectively from the Department of Agriculture (USDA), the National Aeronautics and Space Administration (NASA), and several other agencies.[14]

All federal R&D dollars spent in Illinois either cover the costs of operating federal R&D units in the state, including paying the salaries of federal R&D personnel working at these units, or are awarded as grants, contracts, or cooperative agreements to entities located in the state. The following is an overview of what becomes of these federal R&D dollars once they arrive in Illinois.

Federal R&D Units in Illinois

Argonne, Illinois, is home to DOE's Argonne National Laboratory–East.

- Argonne National Laboratory–East is a part of a federally funded research and development center (FFRDC) sponsored by DOE and operated by the University of Chicago. The other portion of this FFRDC is in Idaho Falls, Idaho. The laboratory is home to more than 200 R&D programs, ranging from studies

[14] For a complete agency-by-agency breakdown of these R&D dollars, see Appendix C.

of the atomic nucleus to global climate change. It also designs, builds, and operates essential R&D facilities that would be financially prohibitive for a single university or company to build and operate. Among the laboratory's R&D facilities are the Advanced Photon Source, the Intense Pulsed Neutron Source, and the Argonne Tandem Linear Accelerator System. This federally owned and contractor-operated facility annually receives approximately $320 million of core funding and conducts an estimated $237 million of specific R&D projects. The laboratory has about 3,555 employees. A portion of the laboratory's funds is spent on the maintenance and operation of R&D equipment and facilities.

Batavia, Illinois, is home to DOE's Fermi National Accelerator Laboratory.

- Fermi National Accelerator Laboratory, commonly referred to as Fermilab, is an FFRDC sponsored by DOE and operated by University Research Association, Inc. (UAR), a consortium of 89 universities in the United States, Canada, Japan, and Italy—most of which are U.S.-based. The laboratory explores the fundamental nature of matter and energy. In pursuit of this mission, it operates the world's highest-energy particle accelerator, the Tevatron, and the world's only hadron collider. Thousands of scientists from around the world, as well as 36 states, use Fermilab's facilities to carry out research at the frontiers of particle physics. This federally owned and contractor-operated laboratory annually receives approximately $279 million of core funding, virtually all of which is spent on specific R&D projects, and has about 2,200 employees. A portion of the laboratory's funds is spent on the maintenance and operation of R&D equipment and facilities.

Champaign-Urbana, Illinois, is home to DOD's Construction Engineering Research Laboratories and USDA's Agricultural Research Service (ARS) Research Facility at the University of Illinois.

- The Construction Engineering Research Laboratories are a unit of the Engineer Research and Development Center within

DOD's U.S. Army Corps of Engineers. The center is headquartered in Vicksburg, Mississippi, with related units in Hanover, New Hampshire, and Alexandria, Virginia. Its R&D activities address the question of how best to support sustainable military installations. Specifically, its research focuses on increasing the Army's ability to more efficiently construct, operate, and maintain its installations and ensure environmental quality and safety at a reduced life-cycle cost. It is located in Champaign to facilitate working with the College of Engineering and other units of the University of Illinois at Champaign-Urbana. This federal unit annually receives about $46 million of federal R&D funds, approximately $20 million of which are spent on in-house activities, and has about 305 civilian personnel. This core staff is supplemented by an additional 100 people from the university.

- The ARS Research Facility at the University of Illinois is a unit of USDA's ARS. It consists of three research divisions focusing on plant physiology and genetics, crop protection, and photosynthesis. The facility conducts research in different areas that contribute to optimal agricultural management. One division researches and identifies rate-limiting steps in nitrogen metabolism in addition to maintaining and evaluating soybean germplasm and corn genetic stock. The research of another division focuses on improving pest management systems to ensure their efficiency and environmental safety, while the research of a third division focuses on identifying and modifying rate-limiting factors of the photosynthesis process. This federal R&D unit annually receives about $3.7 million of federal R&D funds and has about 42 FTEs.

Chicago, Illinois, is home to a unit of DOD's Office of Naval Research.

- The R&D Management Command is a unit of the Office of Naval Research (ONR) inside DOD. ONR is headquartered in Arlington, Virginia, and provides R&D managers to oversee the extramural R&D programs of the Navy and Marine Corps performed by universities, nonprofit organizations, or for-profit

companies. ONR sponsors extramural R&D programs in information, electronics, and surveillance; ocean, atmosphere, and space; engineering, materials, and physical science; human systems; and naval expeditionary warfare. This federal unit annually receives approximately $652,000 of federal R&D funds to support the in-house management activities of about 14 FTEs.

Evanston, Illinois, is home to a USDA Forest Service R&D Work Site.

- The R&D Work Site is a unit of the North Central Forest Experiment Station inside USDA's Forest Service. It conducts research on the management of forest environments for urban populations. Specific research activities of this unit include developing and providing information and guidelines for managing urban forest settings based on improved understanding or urbanites' values, perceptions, and interactions in these settings. This federal R&D unit annually receives approximately $1.4 million of federal R&D funds and has about seven employees.

Great Lakes, Illinois, is home to DOD's Naval Dental Research Institute.

- The Naval Dental Research Institute is a unit of DOD. It researches, develops, and tests new methods and materials for limiting oral disease, reducing dental emergencies, maximizing operational readiness, and promoting dental health for Navy and Marine Corps personnel. This federal unit annually receives approximately $1.8 million of federal R&D funds, all of which are spent on in-house activities, and has about 11 civilian personnel.

Hines, Illinois, is home to a Department of Veterans Affairs (DVA) R&D unit.

- While the principal focus of the VA Medical Center in Hines, Great Lakes Health Care System/Edward Hines Jr. Hospital, is providing medical care to veterans, it is also the location of a number of research activities. In a recent year, this federally

owned and operated facility was the site of 592 projects with total funding of approximately $7.2 million. These R&D activities focus on a wide range of topics, including spinal cord injuries, obstructive lung diseases, drug treatments and therapies, and prostatic neoplasms.

Peoria, Illinois, is home to USDA's National Center for Agricultural Utilization Research.

- The National Center for Agricultural Utilization Research (NCAUR) is a unit of USDA's ARS. It conducts research on new uses of agricultural commodities for industrial and food products. Organized into 10 research divisions, this federal R&D unit maintains a mixed portfolio of interdisciplinary science, covering the spectrum from fundamental to applied research, including food quality and safety, mycotoxins, bioactive agents, oil chemicals, plant polymers, biomaterial processing, fermentation processing, microbial properties, biopolymers, and new crops. It also serves as USDA's primary Technology Transfer Facility. This federal R&D unit annually receives approximately $26 million of federal R&D funds and has about 257 FTEs.

Rock Island, Illinois, is home to a unit of DOD's Armament Research, Development, and Engineering Center.

- The Rock Island Site is a unit of the Army's Armament Research, Development, and Engineering Center inside DOD. The center is headquartered in Picatinny, New Jersey, with subordinate research activities in Rock Island, Illinois; Watervliet, New York; and Aberdeen, Maryland. The center's focus is on integrating complex armament technologies into guns, ammunition, and fire control systems through research, development, acquisition, and sustainment. The Rock Island Site provides essential production capability for artillery/gun mounts, equipment integration, spare parts, and other equipment for the armed forces, as well as the assembly of tools, sets, kits, and outfits that support equipment in the field. This federal unit annually receives approximately $50,000 of federal R&D funds for

in-house activities and has about 130 civilian personnel, only a fraction of whom are directly involved in R&D activities.

Urbana, Illinois, is home to DOI's Illinois District Office of Water Resources.

- The Illinois District Office of Water Resources is a unit of DOI's USGS. It oversees the R&D activities of USGS's National Water-Quality Assessment (NAWQA), Ground-Water Resources Assessment, Toxic Substances Hydrology, and Federal State Cooperatives programs. The NAWQA program conducts research on the nation's surface and groundwater resources to better understand the effect of pesticides, erosion, and bacterial contamination on water quality. The Ground-Water Resources Assessment program studies groundwater systems to develop models and simulations to better understand the workings of these systems. The Toxic Substances Hydrology program studies the behavior of toxic substances in hydrologic environments. These research activities investigate subsurface contamination at local releases and aquatic ecosystem contamination on a watershed and regional scale. The Federal State Cooperatives program studies the effects of agricultural chemicals, floods, droughts, and waste disposal on water supply and groundwater quality. This federal unit annually receives approximately $1.9 million in federal R&D funds.

Chicago and Danville, Illinois, are home to VA Medical Centers. While the principal focus of all of these federally owned and operated facilities is providing medical care to veterans, each center is also the location of a number of research activities. In a recent year, these federally owned and operated facilities have been the site of 486 R&D projects with total funding of approximately $4 million. These R&D activities focus on a wide range of topics, including radiotherapy, prostatic neoplasms, lung neoplasms, and drug therapy.

Federal R&D Grants to Illinois Entities

Every major institution of higher education in Illinois is the recipient of significant federal R&D dollars each year through grants made by federal agencies to faculty, graduate students, and research centers. The vast majority of the R&D grants are made by HHS, NSF, and DOD to individual faculty members and therefore ultimately inure to the benefit of such institutions as the University of Illinois, the University of Chicago, Northwestern University, Loyola University, Illinois Institute of Technology (IIT), Southern Illinois University (SIU), Finch University of Health Sciences/Chicago Medical School (FUHS/CMS), Northern Illinois University (NIU), and Chicago State University. The table below shows the total number of R&D grants that were active in FY 1998, highlighting those made by HHS, NSF, and DOD to parties at the various institutions and estimates of the total dollars transferred to them in FY 1998 pursuant to the terms of these grants. Among the grants in the "Other Agencies" category going to U of Illinois are $14 million from DOE, $8 million from USDA, $4 million from NASA, $3 million from the Department of Education, and $2 million from the Environmental Protection Agency (EPA). The grants in this same category going to the U of Chicago are split between DOE and NASA.

Table 14.1 – Sources of Federal R&D Grants to Higher Education in Illinois

	HHS		NSF		DOD		Other Agencies		Total	
Institution	Amount	#	Amount	#	Amount	#	Amount	#	Amount	#
U of Illinois	$86M	518	$40M	585	$15M	97	$34M	543	$174M	1,743
U of Chicago	$96M	389	$16M	218	$1M	8	$7M	106	$120M	721
Northwestern	$75M	363	$21M	270	$10M	65	$8M	106	$114M	804
Loyola	$15M	110	$1M	15	<$1M	2	<$1M	2	$17M	129
IIT	$4M	7	$1M	19	$3M	11	$1M	15	$8M	52
SIU	$3M	39	$2M	37	<$1M	1	$1M	22	$6M	99
FUHS/CMS	$4M	35	<$1M	2	<$1M	0	0	0	$4M	37
NIU	$1M	11	$1M	29	$1M	3	<$1M	4	$3M	47
Chicago State	$1M	2	<$1M	2	<$1M	1	0	0	$1M	5
Other	$2M	24	$1M	37	<$1M	1	<$1M	15	$4M	77
Total	$287M	1,498	$82M	665	$30M	189	$51M	813	$450M	3,165

These activities are particularly significant because they fund much of the "basic research" so critical to expanding our knowledge and understanding of fundamental scientific phenomena. In addition, these funds account for a substantial portion of the dollars available each year to various academic departments within these institutions, such as the Chemistry Department at the University of Illinois.

Several other nonacademic institutions in Illinois also receive a significant amount of federal R&D grants each year. Foremost among the institutions that received R&D grants in FY 1998 are Rush-Presbyterian-St. Luke's Medical Center in Chicago ($30 million), the American College of Obstetricians and Gynecologists ($6 million), and the American College of Surgeons in Peoria ($4 million).

Scattered among these grants, as well as among the contracts discussed in the section below, are small business innovative research (SBIR) awards. These are special awards made by the SBIR programs supported by the 10 federal agencies with annual budgets for extramural R&D of more than $100 million. In a recent year, small businesses in Illinois received 68 SBIR awards totaling $15 million. Examples include a $600,000 award from the Navy to Horrigan Analytics in Chicago to develop a configurable mine countermeasure dynamic planning tool and a $200,000 award from USDA to C&A Country Gardens in Clinton to develop a foam in-place mulching method for specialty crops.

Also included among these grants are formula grants from federal agencies. Formula grants differ from the much more common project grants in that the money transmitted through formula grants is allocated to a state or one of its subdivisions in accordance with a distribution formula prescribed by law or regulation. Among the formula grants benefiting Illinois are ones valued at more than $5.4 million from USDA's Cooperative State Research, Education, and Extension Service (CSREES) to State Agricultural Experiment Stations, forestry schools, and veterinary colleges for the support of research in agriculture, forestry, and animal health and disease. Similarly, a modest formula grant goes from the U.S. Geological Survey (USGS) inside the Department of the Interior (DOI) to the Water Resources Research Institute in Illinois every year to foster research in water and water-related problems.

Other Federal R&D Activities in Illinois

Several entities located in Illinois also receive notable sums in the form of contracts or cooperative agreements from federal agencies for specific R&D efforts. By far, the majority of these funds go from DOD to Northrop Grumman, which in FY 1998 received close to $276 million in contracts for R&D work on such programs as the Joint Surveillance and Target Attack Radar System (JSTARS) and the F-15E aircraft. In addition, North Central Regional Educational Laboratory, Primex Technologies, and IITRI each received between $18 million and $30 million of R&D contracts from federal agencies in FY 1998. The University of Illinois and Northwestern University also received contracts from various federal agencies to conduct R&D for the federal government that collectively totaled $15 million in FY 1998. Although these amounts are notable, they do not come close to eclipsing the funds that these institutions receive from federal R&D grants.

A total of $71 million of federal R&D dollars in the form of cooperative agreements was also received in FY 1998 by entities located in Illinois. By far the largest of these cooperative agreements ($10 million) came from DOE to M-C Power Corporation for research on the design of molten carbonate fuel cells. Other federal agencies awarding cooperative agreements to Illinois-based entities include NSF, DOD, and DOC. Among these latter cooperative agreements are awards supporting three of NSF's Science and Technology Centers—the Center of Astrophysical Research in Antarctica, which is headquartered at the University of Chicago; the Center for Advanced Cement-Based Materials at Northwestern University; and the center for Superconductivity at the University of Illinois-Urbana. The latter center is the largest federally funded university-based research effort on high-temperature superconductivity in the United States. In addition, Illinois is home to two of NSF's Materials Research Science and Engineering Centers—the Materials Center at the University of Chicago and the Materials Research Center at Northwestern University in Evanston, Illinois.

Summary Tables

The following tables provide summary information on the federal R&D funds received in FY 1998 by the states. Please note that the information presented in the tables is specifically intended to permit comparisons among the states along relevant but quite different dimensions.

Each of the tables contains identical information that has been ordered differently. Specifically, the first column on each table lists the states. The second column contains estimates of the total R&D outlays made in FY 1998 by the federal government to the states. The third column provides the ranking of the states according to the estimated federal R&D outlays contained in the second column. The fourth column provides the total federal funds received by states in FY 1998 that were not mandatory payments made by the federal government to specific individuals residing in the state (i.e., were not entitlements, such as Social Security, Medicare, and disability payments). The fifth column is the percentage of the federal nonentitlement funds received by the states in FY 1998 that were R&D dollars (i.e., the second column divided by the fourth column multiplied by 100). The sixth column is the total number of people residing in the states in FY 1998. The last column is the amount of federal R&D dollars received in FY 1998 for each person residing in the various states (i.e., the second column divided by the sixth column).

The first table lists the states alphabetically. The second table ranks the states according the total R&D outlays made in FY 1998 by the federal government to the states. The third table ranks the states according to the percent that R&D comprises of the total federal funds received by states in FY 1998 that were not mandatory payments made by the federal government to specific individuals residing in the

state (i.e., were not entitlements, such as Social Security, Medicare, and disability payments). Finally, the fourth table ranks the states according to the amount of federal R&D dollars received in FY 1998 for each person residing in the various states (i.e., federal R&D dollars per capita).

Table S.1 – States Listed Alphabetically

State (including DC and PR)	Estimated Federal R&D Outlays in FY 1998 (000's)	Rank by Estimated R&D Dollars Received	Total Non-Entitlement Federal Funds Received in FY 1998 (000's)	% R&D of Total Federal Funds	Resident Population in FY 1998	Federal R&D Dollars Per Capita
Alabama	2,354,882	11	10,209,000	23	4,351,999	541
Alaska	134,847	41	3,572,000	4	614,010	220
Arizona	861,820	20	10,473,000	8	4,668,631	185
Arkansas	119,595	42	3,969,000	3	2,538,303	47
California	14,420,247	1	74,799,000	19	32,666,550	441
Colorado	1,422,677	16	10,844,000	13	3,970,971	358
Connecticut	819,497	22	8,824,000	9	3,274,069	250
Delaware	59,811	47	1,260,000	5	743,603	80
District of Columbia	2,688,207	10	20,737,000	13	523,124	5,139
Florida	3,173,704	7	25,144,000	13	14,915,980	213
Georgia	4,428,750	4	16,820,000	26	7,642,207	580
Hawaii	223,150	37	4,800,000	5	1,193,001	187
Idaho	273,549	32	2,726,000	10	1,228,684	223
Illinois	1,366,250	17	20,222,000	7	12,045,326	113
Indiana	474,974	26	8,302,000	6	5,899,195	81
Iowa	251,820	35	4,295,000	6	2,862,447	88
Kansas	165,404	39	4,930,000	3	2,629,067	63
Kentucky	112,498	43	10,574,000	1	3,936,499	29
Louisiana	244,331	36	9,061,000	3	4,368,967	56
Maine	78,985	46	3,375,000	2	1,244,250	63
Maryland	8,078,434	2	23,481,000	34	5,134,808	1,573
Massachusetts	3,610,561	6	16,310,000	22	6,147,132	587
Michigan	827,266	21	13,303,000	6	9,817,242	84
Minnesota	652,853	24	7,698,000	8	4,725,419	138
Mississippi	321,814	30	6,138,000	5	2,752,092	117
Missouri	1,441,134	15	14,461,000	10	5,438,559	265
Montana	79,650	45	2,129,000	4	880,453	90
Nebraska	93,019	44	2,961,000	3	1,662,719	56
Nevada	380,036	27	2,721,000	14	1,746,898	218
New Hampshire	270,182	33	2,014,000	13	1,185,048	228
New Jersey	1,522,965	14	14,657,000	10	8,115,011	188
New Mexico	2,307,407	13	7,897,000	29	1,736,931	1,328
New York	2,937,583	8	41,301,000	7	18,175,301	162
North Carolina	922,825	19	14,030,000	7	7,546,493	122
North Dakota	58,242	49	1,879,000	3	638,244	91
Ohio	2,738,664	9	18,343,000	15	11,209,493	244
Oklahoma	164,666	40	7,077,000	2	3,346,713	49
Oregon	320,120	31	5,474,000	6	3,281,974	98
Pennsylvania	2,347,373	12	22,850,000	10	12,001,451	196
Puerto Rico	58,810	48	5,008,000	1	3,860,091	15
Rhode Island	515,347	25	2,396,000	22	988,480	521
South Carolina	204,764	38	8,260,000	2	3,835,962	53
South Dakota	39,317	52	1,832,000	2	738,171	53
Tennessee	707,956	23	13,259,000	5	5,430,621	130
Texas	4,021,787	5	40,866,000	10	19,759,614	204
Utah	376,776	28	4,299,000	9	2,099,758	179
Vermont	58,114	50	1,235,000	5	590,883	98
Virginia	4,592,915	3	34,306,000	13	6,791,345	676
Washington	1,254,429	18	14,954,000	8	5,689,263	220
West Virginia	260,775	34	3,827,000	7	1,811,156	144
Wisconsin	375,793	29	7,456,000	5	5,223,500	72
Wyoming	40,783	51	1,401,000	3	480,907	85

The information in Columns 4 and 6 is from the *Consolidated Federal Funds Report: 1998* issued in April 1999 by the Census Bureau in the Department of Commerce.

Table S.2 – States Ranked by Amount of Federal R&D Funds Received

State (including DC and PR)	Estimated Federal R&D Outlays in FY 1998 (000's)	Rank by Estimated R&D Dollars Received	Total Non-Entitlement Federal Funds Received in FY 1998 (000's)	% R&D of Total Federal Funds	Resident Population in FY 1998	Federal R&D Funds Per Capita
California	14,420,247	1	74,799,000	19	32,666,550	441
Maryland	8,078,434	2	23,481,000	34	5,134,808	1,573
Virginia	4,592,915	3	34,306,000	13	6,791,345	676
Georgia	4,428,750	4	16,820,000	26	7,642,207	580
Texas	4,021,787	5	40,866,000	10	19,759,614	204
Massachusetts	3,610,561	6	16,310,000	22	6,147,132	587
Florida	3,173,704	7	25,144,000	13	14,915,980	213
New York	2,937,583	8	41,301,000	7	18,175,301	162
Ohio	2,738,664	9	18,343,000	15	11,209,493	244
District of Columbia	2,688,207	10	20,737,000	13	523,124	5,139
Alabama	2,354,882	11	10,209,000	23	4,351,999	541
Pennsylvania	2,347,373	12	22,850,000	10	12,001,451	196
New Mexico	2,307,407	13	7,897,000	29	1,736,931	1,328
New Jersey	1,522,965	14	14,657,000	10	8,115,011	188
Missouri	1,441,134	15	14,461,000	10	5,438,559	265
Colorado	1,422,677	16	10,844,000	13	3,970,971	358
Illinois	1,366,250	17	20,222,000	7	12,045,326	113
Washington	1,254,429	18	14,954,000	8	5,689,263	220
North Carolina	922,825	19	14,030,000	7	7,546,493	122
Arizona	861,820	20	10,473,000	8	4,668,631	185
Michigan	827,266	21	13,303,000	6	9,817,242	84
Connecticut	819,497	22	8,824,000	9	3,274,069	250
Tennessee	707,956	23	13,259,000	5	5,430,621	130
Minnesota	652,853	24	7,698,000	8	4,725,419	138
Rhode Island	515,347	25	2,396,000	22	988,480	521
Indiana	474,974	26	8,302,000	6	5,899,195	81
Nevada	380,036	27	2,721,000	14	1,746,898	218
Utah	376,776	28	4,299,000	9	2,099,758	179
Wisconsin	375,793	29	7,456,000	5	5,223,500	72
Mississippi	321,814	30	6,138,000	5	2,752,092	117
Oregon	320,120	31	5,474,000	6	3,281,974	98
Idaho	273,549	32	2,726,000	10	1,228,684	223
New Hampshire	270,182	33	2,014,000	13	1,185,048	228
West Virginia	260,775	34	3,827,000	7	1,811,156	144
Iowa	251,820	35	4,295,000	6	2,862,447	88
Louisiana	244,331	36	9,061,000	3	4,368,967	56
Hawaii	223,150	37	4,800,000	5	1,193,001	187
South Carolina	204,764	38	8,260,000	2	3,835,962	53
Kansas	165,404	39	4,930,000	3	2,629,067	63
Oklahoma	164,666	40	7,077,000	2	3,346,713	49
Alaska	134,847	41	3,572,000	4	614,010	220
Arkansas	119,595	42	3,969,000	3	2,538,303	47
Kentucky	112,498	43	10,574,000	1	3,936,499	29
Nebraska	93,019	44	2,961,000	3	1,662,719	56
Montana	79,650	45	2,129,000	4	880,453	90
Maine	78,985	46	3,375,000	2	1,244,250	63
Delaware	59,811	47	1,260,000	5	743,603	80
Puerto Rico	58,810	48	5,008,000	1	3,860,091	15
North Dakota	58,242	49	1,879,000	3	638,244	91
Vermont	58,114	50	1,235,000	5	590,883	98
Wyoming	40,783	51	1,401,000	3	480,907	85
South Dakota	39,317	52	1,832,000	2	738,171	53

The information in Columns 4 and 6 is from the *Consolidated Federal Funds Report: 1998* issued in April 1999 by the Census Bureau in the Department of Commerce.

Table S.3 – States Ranked by Percentage of Federal Funds Received That Are R&D

State (including DC and PR)	Estimated Federal R&D Outlays in FY 1998 (000's)	Rank by Estimated R&D Dollars Received	Total Non-Entitlement Federal Funds Received in FY 1998 (000's)	% R&D of Total Federal Funds	Resident Population in FY 1998	Federal R&D Dollars Per Capita
Maryland	8,078,434	2	23,481,000	34	5,134,808	1,573
New Mexico	2,307,407	13	7,897,000	29	1,736,931	1,328
Georgia	4,428,750	4	16,820,000	26	7,642,207	580
Alabama	2,354,882	11	10,209,000	23	4,351,999	541
Massachusetts	3,610,561	6	16,310,000	22	6,147,132	587
Rhode Island	515,347	25	2,396,000	22	988,480	521
California	14,420,247	1	74,799,000	19	32,666,550	441
Ohio	2,738,664	9	18,343,000	15	11,209,493	244
Nevada	380,036	27	2,721,000	14	1,746,898	218
New Hampshire	270,182	33	2,014,000	13	1,185,048	228
Virginia	4,592,915	3	34,306,000	13	6,791,345	676
Colorado	1,422,677	16	10,844,000	13	3,970,971	358
District of Columbia	2,688,207	10	20,737,000	13	523,124	5,139
Florida	3,173,704	7	25,144,000	13	14,915,980	213
New Jersey	1,522,965	14	14,657,000	10	8,115,011	188
Pennsylvania	2,347,373	12	22,850,000	10	12,001,451	196
Idaho	273,549	32	2,726,000	10	1,228,684	223
Missouri	1,441,134	15	14,461,000	10	5,438,559	265
Texas	4,021,787	5	40,866,000	10	19,759,614	204
Connecticut	819,497	22	8,824,000	9	3,274,069	250
Utah	376,776	28	4,299,000	9	2,099,758	179
Minnesota	652,853	24	7,698,000	8	4,725,419	138
Washington	1,254,429	18	14,954,000	8	5,689,263	220
Arizona	861,820	20	10,473,000	8	4,668,631	185
New York	2,937,583	8	41,301,000	7	18,175,301	162
West Virginia	260,775	34	3,827,000	7	1,811,156	144
Illinois	1,366,250	17	20,222,000	7	12,045,326	113
North Carolina	922,825	19	14,030,000	7	7,546,493	122
Michigan	827,266	21	13,303,000	6	9,817,242	84
Iowa	251,820	35	4,295,000	6	2,862,447	88
Oregon	320,120	31	5,474,000	6	3,281,974	98
Indiana	474,974	26	8,302,000	6	5,899,195	81
Tennessee	707,956	23	13,259,000	5	5,430,621	130
Mississippi	321,814	30	6,138,000	5	2,752,092	117
Wisconsin	375,793	29	7,456,000	5	5,223,500	72
Delaware	59,811	47	1,260,000	5	743,603	80
Vermont	58,114	50	1,235,000	5	590,883	98
Hawaii	223,150	37	4,800,000	5	1,193,001	187
Alaska	134,847	41	3,572,000	4	614,010	220
Montana	79,650	45	2,129,000	4	880,453	90
Kansas	165,404	39	4,930,000	3	2,629,067	63
Nebraska	93,019	44	2,961,000	3	1,662,719	56
North Dakota	58,242	49	1,879,000	3	638,244	91
Arkansas	119,595	42	3,969,000	3	2,538,303	47
Wyoming	40,783	51	1,401,000	3	480,907	85
Louisiana	244,331	36	9,061,000	3	4,368,967	56
South Carolina	204,764	38	8,260,000	2	3,835,962	53
Maine	78,985	46	3,375,000	2	1,244,250	63
Oklahoma	164,666	40	7,077,000	2	3,346,713	49
South Dakota	39,317	52	1,832,000	2	738,171	53
Puerto Rico	58,810	48	5,008,000	1	3,860,091	15
Kentucky	112,498	43	10,574,000	1	3,936,499	29

The information in Columns 4 and 6 is from the *Consolidated Federal Funds Report: 1998* issued in April 1999 by the Census Bureau in the Department of Commerce.

Table S.4 – States Ranked by Federal R&D Funds Received per Capita

State (including DC and PR)	Estimated Federal R&D Outlays in FY 1998 (000's)	Rank by Estimated R&D Dollars Received	Total Non-Entitlement Federal Funds Received in FY 1998 (000's)	% R&D of Total Federal Funds	Resident Population in FY 1998	Federal R&D Dollars Per Capita
District of Columbia	2,688,207	10	20,737,000	13	523,124	5,139
Maryland	8,078,434	2	23,481,000	34	5,134,808	1,573
New Mexico	2,307,407	13	7,897,000	29	1,736,931	1,328
Virginia	4,592,915	3	34,306,000	13	6,791,345	676
Massachusetts	3,610,561	6	16,310,000	22	6,147,132	587
Georgia	4,428,750	4	16,820,000	26	7,642,207	580
Alabama	2,354,882	11	10,209,000	23	4,351,999	541
Rhode Island	515,347	25	2,396,000	22	988,480	521
California	14,420,247	1	74,799,000	19	32,666,550	441
Colorado	1,422,677	16	10,844,000	13	3,970,971	358
Missouri	1,441,134	15	14,461,000	10	5,438,559	265
Connecticut	819,497	22	8,824,000	9	3,274,069	250
Ohio	2,738,664	9	18,343,000	15	11,209,493	244
New Hampshire	270,182	33	2,014,000	13	1,185,048	228
Idaho	273,549	32	2,726,000	10	1,228,684	223
Washington	1,254,429	18	14,954,000	8	5,689,263	220
Alaska	134,847	41	3,572,000	4	614,010	220
Nevada	380,036	27	2,721,000	14	1,746,898	218
Florida	3,173,704	7	25,144,000	13	14,915,980	213
Texas	4,021,787	5	40,866,000	10	19,759,614	204
Pennsylvania	2,347,373	12	22,850,000	10	12,001,451	196
New Jersey	1,522,965	14	14,657,000	10	8,115,011	188
Hawaii	223,150	37	4,800,000	5	1,193,001	187
Arizona	861,820	20	10,473,000	8	4,668,631	185
Utah	376,776	28	4,299,000	9	2,099,758	179
New York	2,937,583	8	41,301,000	7	18,175,301	162
West Virginia	260,775	34	3,827,000	7	1,811,156	144
Minnesota	652,853	24	7,698,000	8	4,725,419	138
Tennessee	707,956	23	13,259,000	5	5,430,621	130
North Carolina	922,825	19	14,030,000	7	7,546,493	122
Mississippi	321,814	30	6,138,000	5	2,752,092	117
Illinois	1,366,250	17	20,222,000	7	12,045,326	113
Vermont	58,114	50	1,235,000	5	590,883	98
Oregon	320,120	31	5,474,000	6	3,281,974	98
North Dakota	58,242	49	1,879,000	3	638,244	91
Montana	79,650	45	2,129,000	4	880,453	90
Iowa	251,820	35	4,295,000	6	2,862,447	88
Wyoming	40,783	51	1,401,000	3	480,907	85
Michigan	827,266	21	13,303,000	6	9,817,242	84
Indiana	474,974	26	8,302,000	6	5,899,195	81
Delaware	59,811	47	1,260,000	5	743,603	80
Wisconsin	375,793	29	7,456,000	5	5,223,500	72
Maine	78,985	46	3,375,000	2	1,244,250	63
Kansas	165,404	39	4,930,000	3	2,629,067	63
Nebraska	93,019	44	2,961,000	3	1,662,719	56
Louisiana	244,331	36	9,061,000	3	4,368,967	56
South Carolina	204,764	38	8,260,000	2	3,835,962	53
South Dakota	39,317	52	1,832,000	2	738,171	53
Oklahoma	164,666	40	7,077,000	2	3,346,713	49
Arkansas	119,595	42	3,969,000	3	2,538,303	47
Kentucky	112,498	43	10,574,000	1	3,936,499	29
Puerto Rico	58,810	48	5,008,000	1	3,860,091	15

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